SECTION 610
CURBS, COMBINATION CURBS AND GUTTERS AND MEDIANS

610.1-DESCRIPTION:

This work shall consist of the construction or resetting of curbs, combination curbs and gutters, and medians in accordance with these Specifications and in reasonably close conformity with the lines, grades, dimensions, and locations shown on the Plans or established by the Engineer.

The types of curbing, combination curbs and gutters, or medians are as follows:

Plain Concrete Curbing
Integral Concrete Curbing
Combination Concrete Curb & Gutters
Reflecting Concrete Curbing
Asphalt Curbing
Medians

610.2-MATERIALS:

Except as provided below, materials shall meet the requirements of the following Subsections of Division 700:

MATERIAL	SUBSECTION
Reinforcing Steel	709.1, 709.4
Joint Tie Bolt Assembly	709.7
Expansion Joint Filler Preformed	708.1
Joint Sealing Material	708.3 or 708.4
PG Binder for Asphalt Curb	705.5*
Asphalt for Tack Coat	705.4 or 705.11
Asphalt Emulsion for Paint Coat	705.4 or 705.11

* Standard grade specified for local area unless indicated otherwise on the Plans.

Concrete shall meet the requirements of 601, Class B, or 501. In addition, the requirements in 610.4 shall govern when reflecting concrete curbing is called for.

Concrete, asphalt mixes, and manufactured curbing materials will be subject to inspection and tests at the plants for compliance with quality requirements.

All materials will be subject to inspection for acceptance as to condition at the latest practicable time the Engineer has the opportunity to check for compliance prior to or during incorporation of materials in the work.

Asphalt curbing component materials shall meet the applicable requirements of Section 401 and the composition of the mix shall meet the following TABLE 610.2:

TABLE 610.2 (MASTER RANGE CRITERIA)

½ in (12.5 mm)	100
3/8 in (9.5 mm)	80 - 100
# 4 (75 mm)	50 – 80
# 8 (2.36 mm)	30 – 60
# 16 (1.18 mm)	20 – 50
# 30 (600 µm)	12 - 36
# 50 (300 µm)	5 – 25
# 200 (75 µm)	3 – 9
% Asphalt	4 - 10

No mix design approval will be required for asphalt curbing, however, the Contractor shall establish a Plant Mix Formula (PMF) for asphalt content and gradation which meets the above requirements and submit it to the District for approval. The District shall review the design and submit a completed T-400 form to the Contract Administration Division, Materials Section. The Materials Section will assign a laboratory number to the design. This PMF shall also include the percentage of any additive that may be used as a stiffener for the curbing mix. If lime or other similar granular additive is used, then this material should be included in the PMF gradation. The mix shall be produced within the allowable tolerances of the following table.

PLANT MIX FORMULA	PLANT MIX TOLERANCE RANGE
Percentage Passing Sieve Sizes 3/8 in(9.5 mm), # 4 (4.75 mm)	± 7 Percentage Points
Percentage Passing Sieve # 8 (2.36 mm)	± 6 Percentage Points
Percentage Passing Sieve Sizes # 16(1.18 mm), # 30(600µm)	± 5 Percentage Points
Percentage Passing Sieve Size # 50(300µm)	± 4 Percentage Points
Percentage Passing Sieve Size # 200(75µm)	± 3 Percentage Points
Percentage of Asphalt	± 0.5 Percentage Points

The Contractor shall perform quality control sampling and testing of the asphalt curbing mix by taking a random sample once per day of production and testing for asphalt content and gradation to verify the materials composition. If testing indicates that the plant mix formula tolerances are not being met, then production shall halt until the reason for any deficiencies are determined and adjustments are made to correct these deficiencies and documented in the plant diary.

CONSTRUCTION METHODS

610.3-PLAIN CONCRETE CURBING, INTEGRAL CONCRETE CURBING, AND COMBINATION CONCRETE CURB AND GUTTER:

610.3.1-Excavation: Excavation shall be made to the required depth, and the base upon which the curb is to be set shall be compacted to a firm, even surface. All soft and unsuitable material shall be removed and replaced with suitable material which shall be thoroughly compacted. When called for on the Plans, the base upon which the curb is to be set shall be constructed of bed course material in accordance with 609.

610.3.2-Form: Forms shall be of wood or metal, straight, free from warp, and of such construction that there will be no interference with the inspection of grade or alignment. All form shall extend for the entire depth of the curb and shall be braced and secured sufficiently so that no deflection from alignment or grade will occur during the placing of the concrete. Forms shall be cleaned and oiled just prior to placing the concrete.

610.3.3-Mixing, Placing, and Finishing: Concrete shall be proportioned,

mixed, and placed in accordance with the requirements for the class of concrete specified. Concrete shall not be transported innonagitating trucks. Compaction of concrete placed in forms shall be by vibration or other acceptable methods. Drainage openings shall be made through the curb, where indicated, or as directed by the Engineer, at the elevation and of the size required. Forms shall be left in place for 24 hours unless the concrete has set sufficiently prior to that time to permit their removal without injury to the curbing. Upon removal of the forms, the exposed curbing face shall be immediately rubbed to a uniform surface. Rubbing shall be accomplished by the use of water and a wood block or carborundum brick. For the purpose of matching adjacent concrete finishes or for other reasons, the Engineer may permit other methods of finishing. No plastering will be permitted. All damaged and rejected curb shall be removed and replaced.

610.3.4-Sections: All concrete curbing shall be constructed in sections having an approximate length of 10 ft. (3 m) unless otherwise indicated on the Plans or directed. In the construction of integral concrete curb or combination concrete curb and gutter abutting concrete pavement, the sections shall be such that the contraction and expansion joints are located opposite the contraction and expansion joints respectively in the pavement. Sections shall be separated by joints ⅛ in. (3 mm) wide except at expansion joints. All joints shall be filled with joint sealing material conforming to the requirements of 708.3.

610.3.5-Expansion Joints: Expansion joints shall be formed at the intervals shown on the Plans using a preformed expansion joint filler having a thickness of ¾ inch (19 mm). When the curb is constructed adjacent to or on concrete pavement, expansion joints shall be located opposite or at expansion joint in the pavement.

610.3.6-Curing: Immediately upon completion of the rubbing, the curbing shall be moistened and kept moist for three days, or the curbing shall be cured by the use of membrane forming material. The methods and details of curing will be subject to the approval of the Engineer.

610.3.7-Backfilling: After the concrete has set sufficiently, the spaces in front and back of the curb shall be refilled to the required elevation with suitable materials, which shall be thoroughly tamped in loose layers of not more than 6 inches (150 mm).

610.3.8-Curb Machine: Where a concrete curb or curb and gutter is not required to be constructed integral with or tied to a concrete base and pavement it may be placed with a self-propelled machine consisting of a hopper and having a power driven screw or screws. The proper density and cross section shall be obtained by forcing the concrete through a mold of the specified cross section. Where a track is used, the track on which the machine operates shall be set and held to the line and grade given by the Engineer. The concrete shall

be of such consistency that it can be molded into the desired shape and will remain as placed without slumping of the vertical or sloping faces.

The consistency test may be omitted, and the yield determined from the volume required, adjusted for waste.

610.4-REFLECTING CONCRETE CURBING:

Construction methods for this item shall conform to the requirements of 610.3 with the following supplements:

The reflecting surface of the curbing shall be a mortar mix consisting of one part white portland cement to 1¾ parts of light colored, washed mortar sand. This mortar mix shall have a thickness of approximately 1 in. (25 mm). Alternately, the entire curbing may be constructed of concrete with white portland cement. When this alternate procedure is used, it shall conform to "Placing of Concrete Curb by Separate Methods" shown on the Plans.

Washed mortar sand shall meet all the requirements for mortar sand and shall be of a light color satisfactory to the Engineer. The reflecting surface mortar shall be placed immediately after placing of the base concrete. In no case shall more than 20 minutes elapse between the placing of the base concrete and the placing of the reflecting surface.

Scoring or surface deformation of finish of the reflecting surface shall conform to the details shown on the Plans. Care shall be taken to prevent discoloration during and after construction of the curb, and, if discolored, it shall be adequately cleaned by a method approved by the Engineer.

610.5- ASPHALT CURBING:

610.5.1-Equipment & Tools: All equipment, tools, and plant machinery to be used for executing the work prescribed will be subject to the approval of the Engineer.

Asphalt curbing shall be constructed by the use of self-propelled automatic curber or curb machine or a paver with curbing attachments. This automatic curber or machine shall meet the following requirements:

i. The weight of the machine shall be such that required compaction is obtained without the machine riding above the bed of which curbing is constructed.
ii. The machine shall form curbing that is uniform in texture, shape, and density.

610.5.2-Excavation: Excavation, when required, shall conform to the requirements of 610.3.1.

610.5.3-Preparation of Bed: When curbing is to be constructed on a fresh laid asphalt surface, the curb shall be laid only after the surface has been cleaned.

When curbing is to be constructed on a cured or aged portland cement

concrete base, asphalt pavement, or asphalt treated base, the bed shall be thoroughly swept and cleaned by compressed air. The surface shall be thoroughly dried and, immediately prior to placing of the asphalt mixture, shall receive a tack coat of asphalt material. The rate of application of tack coat material shall be between 0.05 to 0.15 gal. per sq. yd. (0.226 to 0.679 liters per square meter) of surface. The Contractor shall prevent the spread of this tack coat to areas outside of the area to be occupied by the curb.

610.5.4-Mixing and Placing: The asphalt mixture specified in 610.2 shall be homogeneously mixed and shall be delivered to the hopper of the curb laying machine at a temperature of not less than 200° F (93° C) nor more than 300° F (150° C). Each hopper load of asphalt plant mix shall be run through thecurb laying machine which has been adjusted to form and properly compact the asphalt curb.

The Engineer may permit the construction of curbing by means other than the automatic curber or machine when short sections or sections with short radii are required or for such other reasons as may seem to warrant it. The resulting curbing shall conform in all respects to the curbing produced by the use of the machine.

610.5.5-Joints: Unless conditions warrant, asphalt curb construction at the specified temperature shall be a continuous operation in one direction to eliminate curb joints. However, where conditions are such that this is not possible, the joints between successive days' work shall be carefully made in such a manner as to insure a continuous bond between the old and new sections of the curb. All contact surface of previously constructed curb shall be given a thin, uniform coat of hot asphalt material just prior to placing the fresh asphalt curb material.

610.5.6-Curing: The newly laid curb shall be protected from traffic by barricades or other suitable methods until the heat of the asphalt mixture has dissipated and the mixture has obtained its proper degree of hardness.

610.5.7-Painting Curb: The completed curb shall be painted with a diluted emulsified asphalt paint coat or emulsified asphalt slurry to prevent moisture absorption. The paint coat shall be prepared with a 50-50 blend of water and emulsified asphalt, grade SS-1.

610.5.8-Seasonal Limitations: No asphalt material shall be laid when the temperature of the air is 50° F (10° C) or less, or during other unfavorable weather conditions.

610.6-MEDIANS:

Medians shall be constructed to the details shown on the Plans. Construction methods shall conform to the applicable requirements in 610.3.

610.7-RESETTING CURB:

610.7.1-Salvage of Curbing: The Contractor shall carefully remove, store, and clean any curbing specified for resetting. The Contractor shall replace any existing curbing, specified to be reset, which is lost, damaged, or destroyed as a result of their operations or because of their failure to store and protect it in a manner that would eliminate its loss or damage.

610.7.2-Excavation: Excavation and bedding shall conform to the requirements of 610.3.1.

610.7.3-Placing Curb: The curb shall be set on a firm bed with the front top arris line conforming to the required line and grade. All sections of curbing shall be set so that the maximum opening between adjacent sections, for the entire exposed top and face, is not more than ¼ in. (6 mm), except that the maximum opening at expansion joints shall be not more than ¾ in. (19 mm). Any dressing of the ends of the curbing necessary to meet this requirement shall be done by the Contractor.

Expansion joints shall be filled with ¾ in. (19 mm) thick expansion joint fillers, which shall be placed concurrently with the curb.

610.7.4-Backfilling: The spaces in front and back of the curb shall be refilled to the required elevation with suitable material. This material shall be placed in loose layers of not more than 6 inches (150 mm) and thoroughly tamped.

610.7.5-Cutting and Fitting: Cutting or fitting shall be done, when necessary, in order to install the curbing at the locations directed.

610.8-METHOD OF MEASUREMENT:

Curbing will be measured by the linear foot (meter) along the front face of the section at the finished grade elevation. Combination curb and gutter will be measured by the linear foot (meter) along the face of the curb. No deduction in length will be made for drainage structures installed in the curbing. Medians will be measured in linear feet (meters) on the surface and along the centerline of the median.

Bed course material will be measured by the cubic yard (meter).

610.9-BASIS OF PAYMENT:

The quantities, determined as provided above, will be paid for at the contract unit prices bid for the items listed below, which prices and payments shall be full compensation for furnishing all the materials and doing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

610.10-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
610001-*	PLAIN CONCRETE CURBING, TYPE “type”	LINEAR FOOT (METER)
610002-*	INTEGRAL CONCRETE CURBING, TYPE “type”	LINEAR FOOT (METER)
610003-*	COMBINATION CONCRETE CURB AND GUTTER, TYPE “type”	LINEAR FOOT (METER)
610004-*	REFLECTING CURBING, TYPE “type”	LINEAR FOOT (METER)
610005-*	ASPHALT CURB, TYPE “type”	LINEAR FOOT (METER)
610006-*	MEDIAN, TYPE “type”	LINEAR FOOT (METER)
610007-*	RESETTING CURB, CURB TYPE “type”	LINEAR FOOT (METER)
610008-*	BED COURSE MATERIAL	CUBIC YARD (METER)

* Sequence number

SECTION 611
PRECAST CONCRETE TRAFFIC DIVIDERS

611.1-DESCRIPTION:

This work shall consist of furnishing precast white portland cement concrete traffic dividers of the kind and size specified, and installing such dividers at the locations specified in accordance with the Plans and these Specifications.

611.2-MATERIALS:

Materials shall meet the requirements specified in the following Subsections of Division 700:

MATERIAL	SUBSECTION
Precast Concrete Traffic Dividers	715.20
Joint Sealer	708.3
Joint Mortar	708.8

611.3-CONSTRUCTION METHODS:

When the traffic dividers are to be placed in bituminous concrete, they shall not be placed until the bituminous concrete surface has been completed. The opening remaining between the bituminous concrete and the traffic dividers shall be filled with joint mortar or joint sealer.

When the traffic dividers are to be placed in portland cement concrete, openings into which the traffic dividers are to be set shall be formed by a method acceptable to the Engineer at the time the portland cement concrete pavement is being placed. The opening remaining between the portland cement concrete pavement and the traffic dividers shall be filled with joint mortar or